

CLAIMS

1. A needle device (100, 200, 300) comprising:

- a mounting surface adapted for application to the skin of a subject,
- 5 - adhesive means (115, 215) arranged on the mounting surface for adhering the needle device to the skin of the subject,
- a plurality of needles (161, 261, 346), each needle comprising a distal pointed end adapted to penetrate the skin of the subject,
- wherein each needle has a first position in which the distal end is retracted relative 10 to the mounting surface, and a second position in which the distal end projects from the mounting surface,
- the needles being arranged such that at least one needle can be moved from its first to its second position or from its second to its first position with at least one other needle not performing the same movement.

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2. A needle device as defined in claim 1, further comprising:

- needle actuating means (140, 145, 146, 165) associated with a plurality of needles, the needle actuating means being operable between a first actuating position and a second actuating position, whereby a first associated needle is moved from its first to its second position and a second associated needle is moved from its second to its first position.

20 3. A needle device as defined in claim 2, wherein the needle actuating means are operable between a plurality of actuating positions, each operation between actuating positions being associated with operation of a corresponding pair of needles between their first and second respectively second and first positions.

25 4. A needle device as defined in claim 2, wherein the needle actuating means is operable between an initial position, in which all associated needles are in their first position, and an actuating position, whereby a needle is moved from its first to its second position.

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5. A needle device as defined in claim 2, wherein the needle actuating means is operable between an actuating position, in which an associated needle is in its second position, and an end position in which all associated needles are in their first position.

6. A needle device as defined in claim 2, wherein each of the associated needles are connected to a needle carrier (162), the actuation means comprising moveable control means (145) in engagement with or operatable to come into engagement with the needle carriers, the position of the control means controlling operation of the needles between their 5 respective first and/or second positions.
7. A needle device as defined in claim 6, wherein the needle carriers are associated with biasing means (165) for moving the respective needle from its first to its second position by a force generated by the biasing means, release of the biasing means being controlled by 10 movement of the control means.
8. A needle device as defined in claim 7, wherein the control means comprises a cam surface (146, 167, 148) with a sloped portion, whereby movement of the sloped portion causes a needle to be moved from its second to its first position against the force of the biasing means. 15
9. A needle device as defined in claim 1, wherein at least one needle is associated with actuation means (240) comprising a biasing means (245) and being operable between an initial position and an actuating position, whereby the needle is moved from its first to its 20 second position against a force generated by the first biasing means.
10. A needle device as defined in claim 9, wherein the actuation means is operable between the actuating position and an end position, whereby the needle is moved from its second to its first position by a force generated by the biasing means. 25
11. A needle device as defined in any of claims 2-10, further comprising electronically controllable driving means for operating the needle actuating means between at least two actuating positions.
- 30 12. A needle device as defined in claim 2, further comprising means (125, 144) preventing a needle from being moved from its first to its second position more than once.
13. A needle device as defined in claim 1, further comprising:
 - a common fluid conduit means (150, 250),

- wherein a plurality of the needles (161, 261) are hollow having a distal and a proximal opening (163), the proximal opening being in fluid communication with the common fluid conduit means when the needle is in its second position.

5 14. A needle device as defined in claim 13, wherein the proximal opening of a hollow needle is not in fluid communication with the common fluid conduit means when the needle is in its first position.

15. A needle device as defined in claim 14, further comprising:

10 - a reservoir (105) adapted to contain a liquid drug and comprising an outlet in fluid communication with the common fluid conduit means.

16. A needle device as defined in claim 15, further comprising:

- expelling means (106) for expelling a drug out of the reservoir and through the skin
15 of the subject via the common fluid conduit means and a hollow needle.

17. A needle device as defined in claim 14, wherein the common fluid conduit means comprises a fluid inlet means (153, 254).

20 18. A needle device as defined in claim 14, further comprising means for withdrawing a body fluid through at least one of the hollow needles, the needle device preferably comprising sensor means capable of being influenced by a body substance drawn through the needle and producing a signal corresponding thereto.

25 19. A needle device as defined in claim 1, wherein at least one of the needles is in the form of a needle sensor (346) comprising sensor means (347) capable of being influenced by a body substance and producing a signal corresponding thereto.

30 20. A needle device as defined in claim 19, further comprising an insertion needle (345) adapted to cooperate with a corresponding needle sensor for inserting the needle sensor subcutaneously.

35 21. A needle device as defined in claim 1, wherein the plurality of needles comprises at least two hollow infusion needles, the hollow infusion needles being arranged such that only one infusion needle can be positioned in the second position at a given time.

22. A system (400) comprising sensor means (410) and drug infusion means (420), the drug infusion means comprising:

- a first mounting surface (421) adapted for application to the skin of a subject,
- 5 - a plurality of hollow needles (422), each needle comprising a distal pointed end adapted to penetrate the skin of the subject,
- wherein each of the hollow needles has a first position in which the distal end is retracted relative to the first mounting surface, and a second position in which the distal end projects from the first mounting surface,
- 10 - the needles being arranged such that at least one needle can be moved from its first to its second position or from its second to its first position with at least one other needle not performing the same movement,
- a reservoir adapted to contain a liquid drug and comprising an outlet in fluid communication with at least one hollow needle when it is in its second position,
- 15 - expelling means for expelling a drug out of the reservoir and through the skin of the subject via the hollow needle, the sensor means comprising:
 - a second mounting surface (411) for application to the skin of a subject,
 - a plurality of needle-formed sensors (412) having a distal end adapted to be inserted subcutaneously through the skin of the subject,
 - wherein each of the needle-formed sensors has a first position in which the distal end is retracted relative to the second mounting surface, and a second position in which the distal end projects from the second mounting surface,
 - the needle-formed sensors being arranged such that at least one needle can be moved from its first to its second position or from its second to its first position with at least one other needle not performing the same movement,
 - each of the needle-formed sensors being adapted for providing a sensor signal indicative of a glucose level in blood,
 - control means adapted to receive signals from the sensors and generate command signals in response thereto in order to keep the blood glucose level of the patient within a desired range, wherein operation of the delivery means is affected by the command signals.

23. A system as defined in claim 22, wherein the drug infusion means and the drug infusion means are arranged in a common housing (500), the first and second mounting surfaces providing a common mounting surface (511).